SINGLE SOURCE SAFETY DOCUMENT
CHAPTER 13
RADIATION PROTECTION PROGRAM

13-1. GENERAL.

a. Policies and procedures for the procurement, production, transfer, storage, use, and disposal of radioactive material and ionizing and non-ionizing producing devices will be developed and maintained by each organization.

b. Policies and procedures developed will delineate responsibilities to ensure that ionizing radiation hazards are minimized and that the control of these items are effectively maintained to ensure exposure to ionizing radiation and the release of radioactive effluents are as low as reasonably achievable (ALARA).

c. Guidance developed will identify and control potential health hazards resulting from the use of equipment capable of producing potentially hazardous non-ionizing radiation.

d. Fort Hamilton Radiation Protection Program coverage will be provided by IMCOM HQ; Dr. Robert Cherry, Health Physicist, (210) 466-0368 or robert.n.cherry.civ@mail.mil.

13-2. IONIZING RADIATION.

a. Commanders:

(1) Ensure there are adequate resources to support the radiation protection program to include, but not limited to, an organizational Radiation Protection Officer (RPO) or an Alternate RPO (ARPO) during all normal duty hours.

(2) Ensure measures are established to control health and safety hazards from ionizing radiation sources and radioactive material.

(3) Ensure occupational exposures are maintained within regulatory limits as ALARA.

(4) Designate an organizational RPO and one alternate RPO.

(5) If the necessity arises for a Radiation Control Committee (RCC), designate members to the organizational RPO.

b. The organizations RPO and ARPO shall be designated in writing. The organizations RPO shall not be assigned duties that will interfere with radiation protection duties. The organizations RPO may be an officer, enlisted, or civilian employee. When a civilian employee is performing the duties of organizations RPO, that employee's job description should be appropriately modified to reflect this additional duty. The organizations RPO and the ARPO:

(1) Establish procedures that will assure the Commanding General, USACASCOM&FL or the appointed designee is advised of any anticipated use of radiation sources or operations other than scheduled calibration of radiac instruments or x-ray equipment used by the U.S. Army Medical Department Activity (MEDDAC) and tenant U.S. Army Forces Command (FORSCOM) units. Routine x-ray procedures conducted by the MEDDAC/U.S. Army Dental Activity (DENTAC) are exempt from the reporting requirements of this paragraph.

(2) Provide advice and instruction on radiological hazards.

(3) Evaluate existing uses of radioactive materials.

(4) Provide operating officials with advice on safety matters in carrying out the responsibilities for radiological safety.

(5) Review all plans for the proposed use of radioisotopes and sources of ionizing radiation.

(6) Be responsible for control of radioactive material. Maintain an inventory of all radioactive material and ionizing radiation producing devices.

(7) Survey incoming and outgoing shipments of radioactive materials.

(8) Recommend method of handling, shielding, storing, and disposing of radioactive materials.

(9) Periodically monitor operations involving ionizing radiations; however, enforcement of rules and regulations is the responsibility of each individual user and his/her supervisor.

(10) Supervise decontamination of all spills.

(11) Perform annual checks to ensure all radiation detection equipment has been properly calibrated.

(12) Consult with and maintain close liaison with other RPOs on the installation to ensure current controls are relative to radiological safety.

(13) Check the use and storage of radiation sources annually.

(14) Review reports of safety violations and recommend corrective action.

(15) In conjunction with the specific user, will provide assistance in completing the application for license to use, possess, handle, or transfer radioactive material or ionizing radiation-producing devices.

c. Principal users:

(1) Be selected from the organization to which the equipment is assigned.

(2) Receive training IAW 19 CFR prior to use of the radioactive material. This training will be verified by the organizations RPO. Training will include:

(a) Fundamentals of radiation safety.

(b) Methods of controlling the radiation dose by time, distance, and shielding.

(c) Operation, adjustment, and knowledge of the limitations of radiation survey instruments that are available for monitoring.

(3) Be qualified to handle and use radioactive materials safely.

(4) Ensure all personnel inform and coordinate with the organizations RPO on matters involving ionizing radiation.

(5) Ensure leak tests are performed annually and records of such tests will be maintained.

(6) Report all proposed changes of source location to the organizations RPO prior to affecting the move.

(7) Ensure Standing Operating Procedures (SOPs) are prepared and reviewed by the organizations RPO.

(8) Ensure radioactive material/source(s) are stored in a controlled area under principle user's supervision and are secured from unauthorized removal from the designated place of storage.

(9) Ensure radiation exposure received by individuals under their supervision is maintained ALARA.

(10) Notify the organizations RPO whenever there are alleged items of noncompliance or any safety hazard.

d. Control Procedures for Radioactive Material. Any sources obtained that require a license, contact IMCOM HQ; Dr. Robert Cherry, Health Physicist, (210) 466-0368 or robert.n.cherry.civ@mail.mil. Submit requests on NRC Form 313, Application for Byproduct

Materials, MEDDAC requests for the procurement, possession, and use of radiation-producing equipment such as x-ray machines, particle generators and accelerators, and other equipment capable of producing x-rays will be submitted to the MEDDAC RPO and a copy furnished to IMCOM HQ; Dr. Robert Cherry, Health Physicist, (210) 466-0368 or robert.n.cherry.civ@mail.mil. MEDDAC radiation surveys will be forwarded to IMCOM HQ; Dr. Robert Cherry, Health Physicist, (210) 466-0368 or robert.n.cherry.civ@mail.mil. annually.

e. Procurement, shipment, transfer or loan, storage, and disposal.

(1) Procurement:

(a) Requests for procurement of radioisotopes and ionizing radiation-producing machines will be forwarded to the RPO for review. All materials will be accrued and licensed in the name of the licensee, as provided in 10 CFR 30. Procurement will not be taken until the required NRC license is received.

(b) An SOP for each project involving ionizing radiation shall be submitted to the RPO. Include the following: subject, brief description of proposal, area/building/ room number, source of ionizing radiation and activity, and type of operation. General safety precautions will be included.

(2) Shipment. Outgoing or incoming radioactive equipment.

(a) Outgoing equipment will be transported IAW 10 CFR 71, 49 CFR 173, or TM 55-313, whichever is applicable.

(b) When transporting such equipment vehicle operators and/or escorts will be briefed as to the potential hazards, methods to minimize hazards, and emergency procedures. No passenger will be in the part of the vehicle containing the radioactive material (body of truck, backseat, etc.). If necessary to leave the radioactive equipment in an unattended vehicle, the container will be locked in or to the vehicle.

(c) When transporting such equipment the vehicle operator and/or escorts will be briefed on the potential hazards, methods to minimize hazards, and emergency procedures.

(d) Incoming equipment shall be reported to the RPO. Notification will be made within 3 hours of receipt during duty hours or within 18 hours if received after duty hours.

(3) Transfer or Loan.

(a) Before any radioactive material can be transferred from one location to another, the RPO must be notified so the location can be properly surveyed and approved.

(b) Transfer or loan of any radioactive material outside the immediate command requires prior approval from the CG, USACASCOM&FL. Requests are submitted through the RPO. Requests will include: type/model of equipment, serial number, NRC license number, justification for proposed transfer. Shipment documents and the NRC 314 (Certification of Disposition of Materials) will be prepared by the owning installation.

(4) Storage.

(a) Store in a fire resistant building or within a fire resistant enclosure.

(b) Storage facility will be locked and access controlled at all times.

(c) Appropriate radiation signs will be posted.

(d) Only authorized personnel will be allowed to enter the storage area.

(e) Individual user of radioactive material that has temporary storage is directly responsible for the manner in which it is stored.

(5) Disposal.

(a) Incidents or losses involving radioactive materials will be reported immediately to IMCOM HQ; Dr. Robert Cherry, Health Physicist, (210) 466-0368.

(b) Unit responsible for equipment lost will conduct formal investigation. Report will be provided the IMCOM HQ; Dr. Robert Cherry, Health Physicist, (210) 466-0368 or robert.n.cherry.civ@mail.mil within 10 days.

f. Radiological Hazards and Personnel Protection.

(a) External radiation or radiation from sources outside the body. These sources may be radioactive materials emitting gamma rays, beta particles, or neutrons, or they may be machines producing radiation, such as x-rays. Since the body penetration by alpha particles is insignificant, they are not considered an external hazard. External radiation causes body damage due to tissue penetration.

(b) Internal radiation or radiation from sources within the body. This hazard is created by ingestion, inhalation, or through skin wounds and deposition of radiation material in the body organs. While alpha particles are not considered an external hazard, the internal hazard of these particles is extreme and considered to be 20 times as hazardous as beta or gamma radiation.

(c) Types of Personal Protection. The protection of personnel is the foremost consideration in any operation involving ionizing radiation. Projects requiring the use of radioactive materials should be well planned. Prepare written job hazard analysis and risk assessment prior to operation.

(1) Protection from external radiation consists of three factors: time, distance, and shielding. Exposure time is determined by the radiation intensity. (Radiation exposure rate x time.) Intensity of radiation decreases as the square of the distance increases from the source. Shielding materials are selected with reference to the type of radiation involved: lead used for gamma and x-ray, plastics for beta, and paraffin or water for neutrons.

(2) Protection from internal radiation requires the prevention of radioactive materials from entering the body through ingestion, inhalation, or wounds. This may be accomplished by the use of protective clothing, masks, or respirators and by preventing contamination. Do not smoke, drink, and eat in radiation areas.

(3) Personnel are also protected from radiation hazards by the erection of barriers and posting of signs in radiation areas and by labeling all radioactive equipment. Written and verbal instructions will be given to personnel involved in the handling of radioactive equipment. Keep contaminated clothing and equipment in marked containers in radiation area until proper disposal can be made. Good housekeeping rules will greatly decrease occurrence of contamination.

(4) Decontamination procedures will depend upon the type and degree of contamination and material contaminated. In minor spills, the person using the radioisotope will confine the contamination of liquids by using absorbent paper. Contaminated dry material will be confined by wetting and using absorbent paper. It is most important that the user be familiar not only with all rules and regulations concerning the handling of radioactive materials, but also with the immediate steps to be taken in case of serious contamination. These steps apply not only to confining and removing the contamination, but also include actions that will protect the user and all other personnel.

NOTE: Immediately notify IMCOM HQ; Dr. Robert Cherry, Health Physicist, (210) 466-0368 in case of contamination.

g. Emergency Procedures.

(1) **ALL CASES INVOLVING PERSONAL INJURY WILL BE REPORTED TO THE ORGINAZATIONS RADIATION PROTECTION OFFICER AND IMCOM HQ; Dr. Robert Cherry, Health Physicist, (210) 466-0368 or robert.n.cherry.civ@mail.mil.** This covers: accidental overexposure of external radiation, ingestion or inhalation of radioactive materials, and wounds (including minor scratches).

(2) In case of liquid spills, don protective rubber gloves and drop absorbent paper on spills. In case of dry spills, don protective rubber gloves and dampen spill thoroughly taking care not to spread the contamination. Water may generally be used except where chemical reaction with water would generate an air contaminant. Oil should not be used.

(3) Spills involving no immediate radiation hazard to personnel will be handled in the following manner: notify all personnel to leave the room and confine the spill. **NOTIFY THE ORGANIZATIONS RPO AND IMCOM HQ; Dr. Robert Cherry, Health Physicist, (210) 466-0368 or robert.n.cherry.civ@mail.mil.**

(4) Spills involving radiation hazard to personnel will be handled in the following manner: notify all persons not involved to leave the room; if the spill is on the skin, flush immediately; if spill is on clothing, discard outer or protective clothing. **NOTIFY THE ORGANIZATIONS RPO AND IMCOM HQ; Dr. Robert Cherry, Health Physicist, (210) 466-0368 or robert.n.cherry.civ@mail.mil.**

(5) Wounds affected by radiation must be washed immediately under running water, spreading the edge of the gash. Do not use oil or solvents--they increase skin absorption.

(6) Permit no person involved in a radiation injury to return to work without clearance from a Radiological Health Officer, Ainsworth Clinic.

(7) Report all radiation accidents to the organizations RPO.

(8) The organizations RPO will notify IMCOM HQ; Dr. Robert Cherry, Health Physicist, (210) 466-0368 or robert.n.cherry.civ@mail.mil. of any incident involving radiation.

(9) Supervisors will prepare a complete history of the emergency and subsequent related activity for the organizations RPO records.

(10) The organizations RPO shall inform the firefighters/first responders of the amounts and types of radioactive material stored in buildings.

13-3. NONIONIZING RADIATION.

a. The commander will designate in writing a radiation protection officer an alternate radiation protection officer whose duties are to manage the nonionizing radiation protection program. The organizations RPO will be provided training, equipment, and support staff commensurate with the extent of his/her responsibilities. Complete program files will be maintained by the organizations RPO to include current records of inventory, SOPs, and records related to safety instruction.

b. Medical activities with nuclear medicine services require a full-time organizational RPO qualified under AR 40-37.

c. Exposure to radiofrequency radiation (RFR) will be controlled to ensure that persons are not subjected to the Department of Defense RFR permissible exposure limits, American National Standards Institute (ANSI) C95.1/3, and American Conference of Governmental Industrial Hygienists (ACGIH).

d. RFR sources will be emplaced and operated to prevent exposure of persons within the hazard distance of the sources.

e. RFR hazard assessments will be performed according to TB Med 523.

f. RFR workers consist of two categories: low-risk and high-risk.

(1) Low-risk workers have a possible, but unlikely, risk of overexposure (e.g., operators of currently fielded systems). This class requires pre-placement and termination examinations using the screening protocol listed below.

(2) High-risk workers routinely work in research development, test, and evaluation (RDTE), or maintenance and are subject to significant risk of overexposure in the workplace. This group will require pre-placement and termination examinations using the diagnostic protocol described below.

g. Medical surveillance programs will be performed as established in AR 40-5.

(1) DOD Manual 6055.5-M standardizes the medical surveillance procedures.

(2) There are four categories of ocular surveillance examinations: pre-placement, periodic, immediate, and termination.

(3) The screening protocol for biennial examinations will consist of those procedures described in TB Med 506 for the applicable job standard (unless modified locally per AR 40-5). If the distance visual acuity (with correction) on the biennial examination is less than that on the pre-placement examination, the worker will be referred to an optometrist or ophthalmologist to determine if there is an actual loss of acuity and, if so, to ascertain its cause.

(4) The diagnostic protocol is used for some pre-placement and termination examinations and for immediate examinations. An optometrist, ophthalmologist, or physician possessing the necessary skills must perform it.

h. Directors/Managers/Supervisors will ensure:

(1) SOPs are published and enforced. They will specify the safety policies concerning operational limitations placed upon equipment and the control of the movement of personnel to ensure that the exposure of personnel is minimized. Under no circumstances should exposure exceed established limits in ARs 40-14, 40-46, and 40-583). Copies of these SOPs will be forwarded to the organizations RPO.

(2) SOPs should include:

(a) Safe working techniques.

(b) Proper use of protective equipment and devices.

(c) Procedures to be followed when an accident or incident occurs.

(d) Daily preoperational, operational, and post-operational checks to ensure proper radiation safety.

(e) The proper markings for controlled areas (ARs 40-37, 385-30, and TB Med 521).

(f) Inventory of equipment capable of producing radiation.

(g) Proper personal protective equipment: electrically-insulated gloves and shoes for protection against electrical shock and RFR burn or insulation from the ground plane, is authorized.

(h) Requirement for annual safety briefings and training regarding the RFR safety needs of individual units. A record of attendees is required and kept on file for 2 years.

13-4. REFERENCES:

a. ARs 11-9, 40-14, 55-38, 335-15, 385-40, 700-64, 725-50, 735-11-2, 740-1, 10-43, 25-400-2, 40-10, 40-46

b. TB Meds 43-0108, 43-0016, 43-0122, 43-0141, 0197, 506, 521, 522, 523

c. TM 3-261, 38-250, 55-315

d. Title 10, Code of Federal Regulations

e. Title 29, Code of Federal Regulations

f. Title 49, Code of Federal Regulations

g. ANSI C95.1 and 3

h. OTSG Policy, Surveillance of Laser and Microwave/ Radiofrequency